

REMARKS/ARGUMENTS

In addition to the prior indication of the allowability of claim 22, based on the prior amendments to claim 17 and the addition of new claim 23, applicants resubmit that all of the claims in this application are in condition for allowance, and therefore reconsideration and allowance of these claims is respectfully solicited.

Claims 17-21 and 23 have been rejected under 35 U.S.C. § 112, first paragraph. The Examiner contends that these claims fail to comply with the written description requirement because the term "that does not form a gas sealing plug" has not been disclosed therein. Furthermore, claim 23 is said to contain new matter because there is no disclosure of using "a fan." The Examiner contends in this regard that two fans are always used. This rejection is respectfully traversed in view of the above amendments and for the reasons set forth hereinafter.

The previous amendment to claim 17 was submitted in response to the Examiner's rejection of that claim over the prior art. In particular, the Examiner had relied upon prior art which was said to teach "gas-sealing conveying" high consistency shredded pulp through a conveyor from a shredder with a pulp inlet and outlet to a reaction vessel. In response, and repeating the description of the present invention from the specification itself, applicants asserted that in accordance with this invention a new pulp treating method is set forth in which, by maintaining the outlet pipe from the pulp shredding vessel directly to the reaction vessel filled with shredded non-compressed pulp, and by maintaining the gas pressure in the pulp shredding vessel higher than that of the reactor vessel, ozone gas is prevented from leaking upstream out to the surroundings. Applicants emphasized at the same time, however,

and particularly as compared to the prior art processes known in this field, neither a plug screw nor a fluffer is required, so that the present invention is rendered far superior and less costly than those in the prior art.

The emphasis on this invention, particularly as compared to this prior art, is in fact specifically set forth in the specification. Turning first to page one thereof, in discussing the background of the invention, traditional systems for ozone bleaching of pulp are discussed, and it is noted that "[t]he function of the plug screw is to compress the shredded pulp to a plug forming a gas lock preventing ozone gas from leaking from the reaction vessel upstream in the system to the surroundings." After discussing this prior art the specification then goes on to discuss the invention, and in paragraph [0013], it is stated that by utilizing the present invention one is able to prevent ozone gas from leaking upstream and out to the surroundings and to do so in a manner in which "neither a plug screw nor a fluffer is needed." (Page 5, lines 1-4.) It is thus clear from the outset that the present specification describes an invention in which the shredded pulp is continuously transported without compressing the pulp out of the pulp shredding vessel through the outlet pipe so that the outlet pipe is kept filled with passing pulp but does not form a gas sealing plug; i.e., as was the case in the prior art.

As for the Examiner's objection to claim 23, although it is believed to be entirely in error in that the disclosure of two fans as a preferred embodiment in the specification certainly does not limit applicants to that embodiment, since the claiming of an embodiment comprising "a fan" includes either one or two fans, it is nevertheless noted that the amendment of claim 23 to require fan means, thus covering each of these embodiments, clearly obviates this objection.

Claims 17-21 have been rejected as being unpatentable over European Patent No. 492,040 ("the '040 patent") in view of International Publication No. WO 96/05365 ("the '365 publication") under 35 U.S.C. § 103(a). The Examiner contends that the '040 patent teaches a dewatering device for dewatering the pulp to a consistency of 25% to 40%, a shredding device including a closed pulp shredding vessel 17, a transporting conduit in the reaction vessel 23' for bleaching the shredded pulp with ozone 19, and furthermore that leakage of ozone into the atmosphere can cause a safety problem. The '040 patent is also said to teach sealing the reactor from the atmosphere at column 5, lines 40-48, and regulation of the pressure to prevent leakage. The '365 publication is said to teach "gas sealing conveying" at page 2, lines 6-7, high consistency shredded pulp through a conveyor from the shredder to the reaction vessel and that during operation the pulp is conveyed through conveyor 16' carrying screw 34 and shaft 22' provided with breaker arms 40. The screw and breaker arms are said to keep pulp passing through the conduit non-compressed as they break up the pulp, and the '365 publication is also said to teach that in gas phase bleaching of pulp downstream of the conveyor would be a vessel with a gaseous reagent which may be toxic and that it is important that the gas not leak through the conveyor into the atmosphere. This reference is said to further teach gas sealing the conduit by using a pressure sensor 36 and differential controller 38 to maintain an upstream pressure greater than the downstream pressure to prevent leakage backwards through the conduit, and it is thus said to be obvious to prevent the ozone gas of the '040 patent from leaking backwards through the pulp in the conduit leading back to the shredder using the pressure sensor and pressure regulating device of the '365 publication as both of these references are said to teach the dangers of leaking ozone into the atmosphere or the breaker arms of the

'040 patent. As for claim 19, reference is made to breaker arms 40 of the '365 publication or breaker arms of the '040 patent shown in Figs. 6 and 7 thereof, and it is said to be obvious that when using the gas sealing means of the '365 publication a gas sealing pulp plug would not be needed as the gas would be prevented from leaking by means of gas pressure. This rejection is respectfully traversed in view of the above amendments and arguments and for the reasons set forth hereinafter.

Turning to the claims now set forth in this application, it is first noted that the claimed system requires that the gas sealed conduit connecting the pulp shredding vessel gas-tightly to the reaction vessel include an outlet pipe which "directly communicates" with the interior of the reaction vessel therethrough. This limitation thus distinguishes, for example, over the cited European patent, as well as the '365 reference, by excluding an intermediate fluffing step, as is required by these references, and particularly the European reference. Indeed, the Examiner appears to have entirely ignored the fact that the '365 reference clearly requires this intermediate fluffing step, which is just as clearly excluded by these claims. At the same time, however, ozone gas is prevented from leaking from the reactor vessel out to the surroundings by the system hereof, even though it eliminates the very means for accomplishing this result in these references; namely, the creation of a gas sealing plug. Claim 17 thus requires transport means to continually transport shredded pulp without compressing the pulp from the shredding vessel through the outlet pipe in order to keep the outlet pipe filled with passing pulp without forming a gas sealing plug. This requirement clearly distinguishes over the cited art. Furthermore, claim 17 requires a pressure regulation device to regulate the gas pressure during operation in the pulp shredding vessel and in the reaction vessel to prevent ozone gas from leaking upstream

into the shredding vessel. These limitations further distinguish over the art.

Turning to the European patent, the overall thrust of this patent is an ozone bleaching reaction in which the pulp is fluffed into as high a surface-area-to-volume ratio as possible, and is then treated in a specific manner in the reaction vessel itself. The background discussion of the European patent thus emphasizes the need for fluffing of such pulps in order to prevent damage to the cellulosic material and to maintain contact with the ozone-containing gas.

Referring to FIG. 2 of the European patent, it is specifically stated that the pulp is fed to a conventional shredder 17 in which large chunks of pulp are broken up into smaller chunks and then to conventional fluffer 18, where the pulp is acted upon to become loose and homogeneous. Indeed, some ozone-containing gas is, in fact, added through line 20 to the fluffer 18 (see FIG. 1). On the other hand, it is noted that claim 17 specifically requires that the transport means continuously transport the shredded pulp from the pulp filling vessel without compressing the pulp out of the pulp filling vessel through the outlet pipe which is kept filled with passing pulp without forming a gas sealing plug, and furthermore that the conduit connecting the shredding vessel gas-tightly to the reaction vessel is gas sealed from the surroundings, such that the outlet pipe directly communicates with the interior of the reaction vessel through that conduit. Such direct communication is clearly not the case in the European patent, where indeed the fluffer 18 is a critical element of that system which must be maintained therein. On the other hand, in accordance with the present invention, use of a fluffer is unnecessary (and is, in fact, excluded by the present claims, which require direct communication between the outlet from the pulp shredding vessel to the reactor vessel) because of the elimination of any step in

the shredding vessel in which a plug is necessary to be formed therein in order to prevent gas leakage. The latter is obtained in accordance with the present invention by the required pressure regulation device in which the gas pressure during operation in the pulp shredding vessel and the reaction vessel is prevented from leaking upstream into the pulp shredding vessel. None of this is in any way taught or suggested by the European patent.

Realizing the severe deficiencies of the prior art, the Examiner has attempted to combine the European patent with the '365 reference. In accordance with the '365 reference, however, conveyor 16 conveys the shredded pulp to outlet 18, and then to an ozone contactor, which can be in communication with a shredding or fluffing device 28 as shown in phantom in FIG. 1. The main thrust of the disclosure in the '365 reference is the critical significance of maintaining that the screw 24 and conveyor 16 formed porous plug serves as a sealing medium for preventing gaseous reagents which may be toxic from leaking or insinuating themselves through conveyor 16 for release into the atmosphere. As stated on page 4 of the '365 reference, the continuously forming and moving plug serves as the only required gas sealing means between the ends of the conveyor and the inlet 14 and outlet 18. While the reference states that during shutdown when the plug advance is halted and gas may possibly weep through the halted plug, a control means can be used in which oxygen or other inert gas is added in relatively small quantities to maintain a somewhat higher pressure in the feed to the sealing conveyor 16 as compared to the downstream pressure. Amended claim 17, however, specifically requires that the pressure regulation device regulate the gas pressure during operation in the pulp shredding vessel and the gas pressure in the reaction vessel to prevent leakage of ozone gas upstream through the outlet pipe into the pulp shredding vessel.

Clearly, the disclosure in the '365 reference includes no system other than the plug during operation for sealing the pulp shredding vessel, and does not suggest that there would be any reason to employ even a small amount of inert gas during operation itself.

It is next noted that at page 6 of the '365 reference, reference is made to the fact that a gas source may provide a continuous, slightly elevated pressure at inlet 14 during system operation in which a shorter length conveyor is utilized. It thus remains clear that this reference does not, and in fact cannot, suggest the use of a closed pulp shredding vessel and transfer means for continuously transporting the shredded pulp without compressing it out of the pulp shredding vessel through the outlet pipe in order to keep the outlet pipe filled with passing pulp that does not form a gas sealing plug.

The attempted combination of the '365 reference with the European patent is said to render the present invention obvious. The truth is, however, that there is no suggestion, when these references are fairly read in context, for ever making that combination, but beyond that there is no reason to suggest that, even if such a combination were made, the present invention would somehow result therefrom, at least not without extensive hindsight reconstruction. The combination, if made, would certainly include a shredder 17 of the European patent, as well as conveyor 16 of the '365 reference for forming a gas sealing pulp plug from the shredded pulp. Indeed, there is clearly no suggestion in the '365 reference which would suggest that one could or should eliminate the screw conveyor 16 which forms the gas sealing plug during operation of that system. To the contrary, the '365 reference teaches that, during system operation, "if it is deemed warranted to use a shorter length conveyor 16 which will not provide for a pulp plug having a sufficient length to prevent gas leakage through the conveyor

16, the differential pressure can be employed as an integral part of the system. In this, of course, the source 32 can provide a continuous, slightly elevated pressure at the inlet 14 all during system operation." (P. 6, lns. 6-9.) It can surely be said that, in accordance with these prior art teachings, it would take at least a level of inventive skill for one of ordinary skill in this art to realize that you can actually do without the pulp plug forming screw conveyor, contrary to all of these prior art teachings.

Furthermore, in attempting to combine these two references, the fluffer 18 would also remain, and it would be necessary to fluff the pulp plug leaving the conveyor prior to entry of the pulp into the reactor itself. Even if one were to thus utilize a slightly elevated pressure at the inlet during system operation in accordance with the disclosure at page 6 of the '365 reference, the system certainly would not include the required elements of claim 17, including a closed pulp shredding vessel with an outlet and transport means for continuously transporting the shredded pulp, without compressing the pulp, out of the pulp shredding vessel through the outlet so that the outlet is kept filled with passing pulp but does not form a gas sealing plug, nor a conduit gas sealed from the surroundings connecting the outlet of the pulp filling vessel gas-tightly to the reaction vessel so that the outlet pipe directly communicates with the reaction vessel through the conduit.

Finally, as for the Examiner's contention that the screw 24 and the breaker bars 40 shown in FIG. 2 of the '365 reference would keep the pulp passing through the conduit non-compressed as they break up the pulp, this is entirely incorrect, since initially the shredded pulp admitted into inlet 14 of conveyor 16 is clearly formed into a pulp plug which advances by screw 24 towards the breaker bars 40. Thus, formation of the pulp plug clearly requires some compression of the shredded pulp or pulp flakes, and furthermore, the breaker bars 40 cannot

possibly fluff the pulp plug, but at best only break the pulp plug into smaller clumps.

It is therefore respectfully submitted that all of the claims now set forth in this application possess the requisite novelty, utility and unobviousness to warrant their immediate allowance, and such action is therefore respectfully solicited. If, however, for any reason the Examiner does not believe that such action can be taken at this time, it is respectfully requested that he telephone applicant's attorney at (908) 654-5000 in order to overcome any additional objections which he might have.

If there are any additional charges in connection with this requested amendment, the Examiner is authorized to charge Deposit Account No. 12-1095 therefor.

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Respectfully submitted,

By



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